

REMARKS

This Amendment is in response to the Office Action mailed September 7, 2007. The Examiner set a shortened statutory period for reply of three (3) months, making the present Amendment due by December 7, 2007.

In the present paper, no amendments are made. Claims 1-13 were canceled in previous papers, and claims 14-22 are withdrawn from consideration. Claims 23-29 are now presented for the Examiner's consideration.

In the official action, the claims were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,632,964 to Ishii et al. ("Ishii") in view of U.S. Patent No. 5,213,767 to Smith et al. ("Smith"), and further in view of U.S. Patent No. 6,749,819 to Otsuka et al. ("Otsuka").

Discussion

Claim 23, the only independent claim under consideration in the case, requires "providing a chamber comprising a first zone containing a bed of metal and a bed of metal oxide, and a second zone containing an ammonia decomposition catalyst." The claim further requires heating the chamber to 200 to 700 °C, and conveying the exhaust gas through those zones so that the exhaust gas is heated by the bed of metal, and subsequently the metalorganic vapour is decomposed by the metal oxide.

In rejecting the claims, the Examiner has made a combination including Ishii and Otsuka, references previously cited, and Smith, a new reference. As previously discussed, Ishii discloses heating the cleaning agent 4 and the ammonia decomposition catalyst 8 in separate vessels to two distinctively different and incompatible temperatures. Specifically, Ishii teaches heating the cleaning agent 4 preferably to 100 °C or lower (Ishii, col. 4, lines 7-10) and heating the ammonia decomposition catalyst 8 preferably to 600-900 °C (col. 4, lines 51-53). Additionally, Ishii does not teach or suggest providing a bed of metal and does not teach exposing the exhaust gas to a heated bed of metal before entering the metal oxide decomposition bed.

The Examiner notes that "Ishii et al. fails to teach a zone comprising a bed of metal and a bed of metal oxide heated to a range of 200-700 °C to cause metalorganic vapor to decompose." The Examiner cites Smith as purportedly teaching those limitations.

Applicants traverse the Examiner's rejection because there is no suggestion anywhere in the art or the cited references to combine Smith with the teachings of Ishii and/or Otsuka. Notwithstanding, the Examiner alleges:

Therefore, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to provide converting hazardous gases by chemical reactions into gaseous products (col. 1, lines 10-17)) wherein gases such as silane and trimethyl borate (col. 1) are decomposed in a first stage of granular silicon (col. 2,4) and a second stage of granular lime (col. 2, 3, 5) at a temperature of 200-550 °C (col. 2, 3) in Ishii et al in order to treat substantially similar gases (gases that poison the ammonia decomposition catalyst) produced in a substantially similar process of producing semi-conductors as taught by Smith et al.

Official Action of 09/07/2007, at 3.

Applicants respectfully disagree. One skilled in the art would not consult Smith to solve the problem addressed by the present invention. More specifically, Smith is not concerned with an exhaust gas containing an organometallic compound. Furthermore, Smith is not concerned with catalytic degradation of ammonia or the use of any catalyst, and thirdly, is certainly not concerned with preventing poisoning of a catalyst.

The Examiner cites the Smith reference as teaching the use of silicon and lime beds at elevated temperatures. Smith, however, uses those beds in a completely different manner from the soda lime cleaning agent of Ishii (or the bed of metal and the bed of metal oxide of claim 23). Smith instead describes a technique for removing halogen gases by a two-stage reaction. In the first, the halogen reacts with silicon to form a gaseous acidic silicon halide, which reacts with basic calcium oxide to form inorganic solid salts (Smith, col. 2, lines 53-64). The two-stage reaction of Smith is furthermore unrelated to the two distinctly different reactions used in the present invention to remove two quite different types of chemical (metalorganics and ammonia).

In attempting to apply the Ishii reference to solve the problem of preventing organometallic compounds from "poisoning" the ammonia catalyst, one skilled in the art would have no reason to consult Smith to replace the separate soda lime cleaning column 3 of Ishii. The Ishii cleaning column 3 is packed with a single agent; i.e., soda lime, and is therefore less complex than the two-stage Smith canister with which the Examiner proposes to replace the Ishii cleaning column. One would not be motivated to replace a simple component with a more complex component.

Further, Ishii specifically teaches using the cleaning column 3 at "100 °C or lower," and that the treatment "can usually be carried out at room temperature." Ishii, col. 4, lines 7-10. In contrast, the Smith reference teaches heating the two-stage column 10 to a preferred temperature of between 350 and 550 °C (silicon stage) and between 250 and 550 °C (soda lime stage). Smith at col. 3, lines 21-48. One would not be motivated to replace a device operable at room temperature with one requiring a heater.

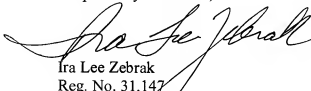
Because there is no suggestion to make the combination made by the Examiner in any of the art of record or elsewhere, Applicants submit that the cited art alone and/or in the combinations suggested by the Examiner does not render independent claim 23 or dependent claims 24-29 obvious.

Conclusion

Applicants therefore assert that pending claims 23-29 are in condition for allowance, and earnestly request that the Examiner issue a Notice of Allowance.

Should the Examiner have any questions regarding the present case, the Examiner should not hesitate in contacting the undersigned at the number provided below.

Respectfully submitted,



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